

CLAIMS

1. A transreflector comprising a suspended particle device (1).
- 5 2. A transreflector according to claim 1, wherein the suspended particle device (1) is configured to apply one or more electric fields to a particle suspension (2).
- 10 3. A transreflector according to claim 2, wherein the suspended particle device (1) is configured to apply to the particle suspension (2) two electric fields with mutually orthogonal orientations.
- 15 4. A transreflector according to claim 2 or 3, wherein the suspended particle device (1) is configured to apply an electric field to the particle suspension (2) intermittently.
- 20 5. A transreflector according to any one of claims 1 to 4, wherein the suspended particle device (1) is configured to switch the particle suspension (2) into one of:
 - a transmissive state; and
 - a reflective state.
- 25 6. A transreflector according to claim 5, wherein the suspended particle device (1) is configured to tune transmittance and reflectance properties of the particle suspension (2) to values intermediate to those associated with said transmissive and reflective states.
- 30 7. A transreflector according to any one of the preceding claims, further configured to tune its transmittance and reflectance properties in accordance with an output of a light sensor (14).
8. A transreflective display (15) comprising:

a display device (16); and
a transreflector (1);
wherein said transreflector (1) is a suspended particle device.

5 9. A transreflective display (15) according to claim 8, wherein the
suspended particle device (1) is configured to apply one or more electric fields
to a particle suspension (2).

10. 10. A transreflective display (15) according to claim 9, wherein the
suspended particle device (1) is configured to apply to the particle suspension
(2) two electric fields with mutually orthogonal orientations.

15. 11. A transreflective display (15) according to claim 9 or 10, wherein
the suspended particle device (1) is configured to apply an electric field to the
particle suspension (2) intermittently.

20. 12. A transreflective display (15) according to any one of claims 8 to
11, wherein the suspended particle device (1) is configured to switch the
particle suspension (2) into one of:
a transmissive state; and
a reflective state.

25. 13. A transreflective display (15) according to claim 12, wherein the
suspended particle device (1) is configured to tune transmittance and
reflectance properties of the particle suspension (2) to values intermediate to
those associated with said transmissive and reflective states.

14. 14. A transreflective display (15) according to any one of claims 8 to
13, wherein the display device (16) is a liquid crystal display device.

30 15. 15. A transreflective display (15) according to any one of claims 8 to
13, wherein the display device (16) is one of:

an electrophoretic display;
an electrochromic display;
an electro-wetting display; and
a micromechanical display.

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16. A transflective display (15) according to any one of claims 8 to 15, further comprising a light source (17).

10 17. A transflective display (15) according to any one of claims 8 to 16, further comprising a quarter-wave plate (22).

18. A transflective display (15) according to claim 16, further comprising a quarter-wave plate (22) positioned between the suspended particle device (1) and light source (17).

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19. A transflective display (15) according to any one of the preceding claims, further comprising a light sensor (14).

20. A method of operating a transreflector (1), comprising tuning 20 transmittance and reflectance properties of the transreflector (1) by controlling alignments of particles within a particle suspension (2).

21. A method according to claim 20, further comprising:
detecting a level of ambient light (21) in the vicinity of the transreflector
25 (1).

22. A method of displaying an image, comprising the steps of:
displaying an image on a display device (16); and
providing illumination for a display device (16);
30 wherein the step of providing said illumination comprises tuning transmittance and reflectance properties of a transreflector (1) by controlling alignments of particles within a particle suspension (2).

23. A method according to claim 22, wherein the step of providing illumination for the display device (16) further comprises operating a light source (17).

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24. A method according to claim 22 or 23, further comprising: detecting a level of ambient light in the vicinity of the display device (16).

10 ~ 25. A method according to any one of claims 20 to 24, wherein the transreflector (1) is tuned in accordance with an output signal of a light sensor (14).

15 26. A method according to any one of claims 20 to 25, wherein the tuning of the transreflector (1) comprises applying one or more electric fields to the particle suspension (2).

20 27. A method according to claim 26, wherein the tuning of the transreflector (1) comprises applying to the particle suspension (2) two electric fields with mutually orthogonal orientations.

28. A method according to claim 26 or 27, wherein the one or more electric fields are applied to the particle suspension (2) intermittently.

25 29. A method according to any one of claims 20 to 28, wherein the step of tuning the transreflector (1) comprises switching the particle suspension (2) into one of;

a transmissive state; and
a reflective state.

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30. A method according to any one of claims 20 to 29, wherein the step of tuning the transreflector (1) comprises tuning its transmittance and

reflectance properties to intermediate values within a range of achievable transmittances and reflectances respectively.